IN THE ABSTRACT

[0057]   A method and apparatus for automatic determination of semiconductor plasma chamber matching a source of fault are provided. Correlated plasma attributes are measured for process used for calibration both in a chamber under study and in a reference chamber. Principal component analysis then is performed on the measured correlated attributes so as to generate steady ~~principle~~ principal components and transitional ~~principle~~ principal components; and these principal components are compared to reference principal components associated with a reference chamber. The process used for calibration includes a regular plasma process followed by a process perturbation of one process parameter. Similar process perturbation runs are conducted several times to include different perturbation parameters. By performing inner products of the ~~principle~~ principal components of chamber under study and the reference chamber, matching scores can be reached. Automatic chamber matching can be determined by comparing these scores with preset control limits. The potential source(s) of chamber fault can also be identified by the lowest matching score(s).

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